IN THE CLAIMS:

Please cancel claims 1-40 without prejudice.

Please add new claims 41-80 as follows:

41. (New) A plasma processing method comprising:

introducing a gas into an interior of a vacuum chamber through a hole in a dielectric tube attached to a metal body fixed to the vacuum chamber, while exhausting gas from the vacuum chamber to keep the vacuum chamber within a specified pressure; and

applying high-frequency power with a frequency ranging from 100kHz to 3GHz to a plasma source facing a substrate mounted on a substrate electrode in the vacuum chamber, to generate plasma in the vacuum chamber to perform plasma processing of the substrate.

42. (New) The plasma processing method of claim 41, wherein the plasma source comprises an antenna, a dielectric plate is arranged between the antenna and the vacuum chamber, and the high-frequency power is applied to the antenna through a penetrating hole at a center of the dielectric plate, the antenna and the vacuum chamber being short-circuited with short pins extending through penetrating holes arranged in the dielectric plate so that the short pins are arranged at approximately equal intervals around a center of the antenna.

43. (New) The plasma processing method of claim 41, wherein the plasma source comprises an antenna, further comprising controlling a plasma distribution on the substrate using a circular and groove-shaped plasma trap arranged between the antenna and the vacuum chamber.

44. (New) The plasma processing method of claim 41, wherein the plasma source comprises an antenna, and the metal body comprises a ring arranged to form a groove-shaped plasma trap between the antenna and the ring, further comprising controlling a plasma distribution on the substrate using the plasma trap.

45. (New) The plasma processing method of claim 41, wherein said introducing of the gas into the interior of the vacuum chamber comprises introducing the gas such that a gas supply flow rate per hole in the dielectric tube is no greater than 50sccm.

46. (New) The plasma processing method of claim 41, wherein said introducing of the gas into the interior of the vacuum chamber comprises introducing a mixed gas including more than 50% argon gas.

47. (New) The plasma processing method of claim 41, wherein said exhausting gas from the vacuum chamber to keep the vacuum chamber within a specified pressure comprises maintaining a pressure no greater than10Pa in the vacuum chamber.

48. (New) The plasma processing method of claim 41, wherein said exhausting gas from the vacuum chamber to keep the vacuum chamber within a specified pressure comprises maintaining a pressure no greater than1Pa in the vacuum chamber.

49. (New) The plasma processing method of claim 41, wherein said applying of the high-frequency power comprises applying a high-frequency power having a frequency of 50MHz to 3GHz to one of the plasma source, the substrate electrode, and a facing electrode.

50. (New) The plasma processing method of claim 41, wherein said introducing of the gas into the interior of the vacuum chamber comprises introducing the gas such that a gas supply flow rate per hole in the dielectric tube is no greater than 200sccm.

51. (New) The plasma processing method of claim 50,wherein said introducing of the gas into the interior of the vacuum chamber comprises introducing the gas such that a gas supply flow rate per hole in the dielectric tube is no greater than 50sccm.

52. (New) The plasma processing method of claim 50, wherein said introducing of the gas into the interior of the vacuum chamber comprises introducing a mixed gas including more than 50% argon gas.

53. (New) The plasma processing method of claim 50, wherein said exhausting gas from the vacuum chamber to keep the vacuum chamber within a specified pressure comprises maintaining a pressure no greater than10Pa in the vacuum chamber.

54. (New) The plasma processing method of claim 50, wherein said exhausting gas from the vacuum chamber to keep the vacuum chamber within a specified pressure comprises maintaining a pressure no greater than1Pa in the vacuum chamber.

55. (New) The plasma processing method of claim 50, wherein said applying of the high-frequency power comprises applying a high-frequency power having a frequency of 50MHz to 3GHz to one of the plasma source, the substrate electrode, and a facing electrode.

56. (New) A plasma processing method comprising:

introducing a gas into an interior of a vacuum chamber through a hole in a dielectric tube attached to a facing electrode facing a substrate electrode in the vacuum chamber, while exhausting gas from the vacuum chamber to keep the vacuum chamber within a specified pressure; and

applying high-frequency power with a frequency ranging from 100kHz to 3GHz to one of the substrate electrode and the facing electrode, to generate plasma in the vacuum chamber and thereby perform plasma processing of a substrate in the vacuum chamber.

57. (New) A plasma processing apparatus comprising:

a vacuum chamber operable to maintain a vacuum therein;

a gas supply device for supplying a gas into said vacuum chamber;

an exhauster for exhausting the gas from said vacuum chamber;

a substrate electrode for supporting a substrate in said vacuum chamber;

a plasma source facing said substrate electrode;

a high-frequency power source for supplying high-frequency power having a frequency in a range of 100kHz to 3GHz to said plasma source; and

a dielectric tube having a gas supply hole formed therethrough, said dielectric tube being attached to a metal body fixed to said vacuum chamber, and being operable to allow the gas supplied to said vacuum chamber by said gas supply device to pass through said gas supply hole so as to enter said vacuum chamber.

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58. (New) The plasma processing apparatus of claim 57, wherein said plasma source comprises an antenna, further comprising a dielectric plate between said vacuum chamber and said antenna, said antenna and said dielectric plate being arranged so as to protrude into said vacuum chamber.

59. (New) The plasma processing apparatus of claim 58, wherein said dielectric plate has a penetrating hole at a center thereof, said high-frequency power source being operable to supply high-frequency power to said antenna through said penetrating hole, said dielectric plate having through-holes formed therein and short pins inserted in said through-holes such that said short pins are arranged at approximately equal intervals around a center of said antenna and such that said antenna and said vacuum chamber are short-circuited by said short pins.

60. (New) The plasma processing apparatus of claim 58, further comprising a circular and groove-shaped plasma trap between said antenna and said vacuum chamber, for controlling plasma distribution on the substrate.

61. (New) The plasma processing apparatus of claim 60, wherein said metal body comprises a ring arranged to form said plasma trap between said ring and said antenna.

62. (New) The plasma processing apparatus of claim 57, wherein said metal body comprises a ring forming a portion of a side wall of said vacuum chamber.

63. (New) The plasma processing apparatus of claim 57, wherein said dielectric tube comprises a dielectric bolt screwed in a tap formed in one of said metal body and a facing electrode.

64. (New) The plasma processing apparatus of claim 57, wherein said dielectric tube has a spot facing for a tool so that said dielectric tube can be rotated and screwed into one of said metal plate and a facing electrode by the tool.

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65. (New) The plasma processing apparatus of claim 57, wherein said dielectric tube protrudes by an amount in a range of 0.5mm to 20mm from a surface of one of said metal body and a facing electrode.

66. (New) The plasma processing apparatus of claim 65, wherein said dielectric tube is formed so as to cover an edge of a hole in one of said metal body and said facing electrode, said dielectric tube being inserted in said hole.

67. (New) The plasma processing apparatus of claim 57, wherein said dielectric tube protrudes by an amount in a range of 1mm to 10mm from a surface of one of said metal body and a facing electrode.

68. (New) The plasma processing apparatus of claim 67, wherein said dielectric tube is formed so as to cover an edge of a hole in one of said metal body and said facing electrode, said dielectric tube being inserted in said hole.

~~69. (New) The plasma processing apparatus of claim 57, wherein said gas supply hole through~~ said dielectric tube has a diameter in a range of 0.2mm to 2mm.

70. (New) The plasma processing apparatus of claim 57, wherein said gas supply hole through said dielectric tube has a diameter in a range of 0.4mm to 0.8mm.

71. (New) The plasma processing apparatus of claim 57, wherein said high-frequency power source is operable to apply high-frequency power to one of said plasma source, said substrate electrode, and a facing electrode having a frequency in a range of 50MHz to 3GHz.

72. (New) A plasma processing apparatus comprising:

a vacuum chamber operable to maintain a vacuum therein;

a gas supply device for supplying a gas into said vacuum chamber;

an exhauster for exhausting the gas from said vacuum chamber;

a substrate electrode for supporting a substrate in said vacuum chamber;

a facing electrode facing said substrate electrode;

a high-frequency power source for supplying high-frequency power having a frequency in a range of 100kHz to 3GHz to one of said substrate electrode and said facing electrode;

a dielectric tube having a gas supply hole formed therethrough, said dielectric tube being attached to a metal body fixed to said facing electrode, and being operable to allow the gas supplied to said vacuum chamber by said gas supply device to pass through said gas supply hole.

73. (New) The plasma processing apparatus of claim 72, wherein said dielectric tube comprises a dielectric bolt screwed in a tap formed in one of said metal body and said facing electrode.

74. (New) The plasma processing apparatus of claim 72, wherein said dielectric tube has a spot facing for a tool so that said dielectric tube can be rotated and screwed into one of said metal plate and said facing electrode by the tool.

75. (New) The plasma processing apparatus of claim 72, wherein said dielectric tube protrudes by an amount in a range of 0.5mm to 20mm from a surface of one of said metal body and said facing electrode.

76. (New) The plasma processing apparatus of claim 72, wherein said dielectric tube protrudes by an amount in a range of 1mm to 10mm from a surface of one of said metal body and said facing electrode.

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77. (New) The plasma processing apparatus of claim 72, wherein said dielectric tube is formed so as to cover an edge of a hole in one of said metal body and said facing electrode, said dielectric tube being inserted in said hole.

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78. (New) The plasma processing apparatus of claim 72, wherein said gas supply hole through said dielectric tube has a diameter in a range of 0.2mm to 2mm.

79. (New) The plasma processing apparatus of claim 72, wherein said gas supply hole through said dielectric tube has a diameter in a range of 0.4mm to 0.8mm.

80. (New) The plasma processing apparatus of claim 72, wherein said high-frequency power source is operable to apply high-frequency power to one of said plasma source, said substrate electrode, and said facing electrode having a frequency in a range of 50MHz to 3GHz.